DEPARTMENT OF NOTES AND REVIEWS

It is the purpose, in this department, to present from time to time brief original notes, both of methods of work and of results, by members of the Society. All members are invited to submit such items. In addition to these there will be given a few brief abstracts of recent work of more general interest to students and teachers. There will be no attempt to make these abstracts exhaustive. They will illustrate progress without attempting to define it, and will thus give to the teacher current illustrations, and to the isolated student suggestions of suitable fields of investigation.—[Editor.]

RECENT CHANGES IN ILLINOIS RIVER BIOLOGY

Forbes and Richardson (Bull. Ill. Nat. Hist. Survey, XIII; 6, April 1919) present an abstract of changes in the biology of the Illinois River in the last twenty years. The chief causes of change are: The increase in the volume of the water due to the opening of the Chicago drainage canal in January, 1900; the great increase in the sewage content of the water due to the same cause; and reclamation of the river bottoms for agricultural purposes.

To illustrate the first of these items it is stated that just one-half the average flow at Peoria for 1913 was thus derived from Lake Michigan. This tends to give constancy to the height of the river, but increases the overflow in high times and extends the period. Depth of river and rate of flow are both increased. The bottom-land lakes which stand at approximately the river level are also correspondingly heightened. Numerous summer shallow-water weedy belts are eliminated. The increased rate of flow insures that the decomposition and assimilation processes formerly occurring in a given length of stream take place further down stream. The results are as tho the stream had been shortened. Carried organisms have less time to multiply and less chance of being devoured in given length of river. The point where the decomposing sewage becomes available for green plants and other plankton is further down stream than before. All the dependent vital phenomena take place further down the river. In spite of the increase of sewage in the river, the rate of flow and volume of water make it true that the river water contains a smaller percentage of sewage in 1914 than before 1900.

The total result of this is that optimum conditions for green plankton which apparently occured at or above La Salle before 1900 now occur not much above Peoria. From this point to the mouth of

the river the food supply in smaller and larger plankton organisms is greatly increased.

The results of levees preventing overflow of the bottoms, together with the draining of the tributary lakes operate in the opposite direction. These stagnant and semi-stagnant waters are perpetually productive of plankton and feed the river with it. With the progressive elimination of the sources a further reduction in the river plankton may be expected.

The total effects of the changing conditions, expressed in terms of the fisheries, are interesting. The increase of yield of fish for the five years preceding the opening of the drainage canal was about 9 per cent per annum; that for the eight years following averaged an annual increase of about 3.5 per cent; while for the next four years there was an average *decrease* of 15 per cent per annum, based on statistics from Havana.

Three factors during this time tended to increase the yield; the introduction of the sewage with its increase of organisms; the rapid increase of European carp which in 1908 furnished 64 per cent of the total product; and increased interest in fishing due to this increase. The rapid progress of reclamation would operate to diminish the yield. The factor of increased fishing doubtless operated in the same way for the later years. The catch was greater than the increase.

It is the purpose of the Survey to find by investigation the treatment, both of the river itself and its adjacent and tributary regions, which may so far as possible allow the maintenance of the fishery properties of the state.

FROGS AND TOADS IN BERMUDA

Pope (Bul. Mus. Comp. Zool. Harvard Coll. May 1917) presents a brief account of the three species of Anura found in the Bermudas. These are *Bufo agua*, the Great Surinam Toad; *Eleutherodactylus johnstonei*, the "whistling" tree frog; and *E. luteolus*. No amphibian is native to Bermuda. The Bufo was imported from British Guiana to capture garden insects, about 1885. The "whistling frog" is thought to have been brought from the Barbadoes, and is known to the Islands as far back as 1880. The *E. luteolus* was discovered in 1916, and nothing is known as to its origin.

There are two points of unusual interest in connection with the situation. The first is that *Bufo agua* is the largest of living toads.